Production and Partially Purification of Protease from Soil Screened Actinomycete Strains

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Background & Objectives: Microbial proteases are among the most important hydrolytic enzymes. This group of enzymes represents one of the three largest groups of industrial enzymes and account for approximately 60% of the total enzyme sales in the world. They have numerous applications in the industrial production of different items. Actinomycetes are industrially important Gram-positive bacteria, well known as exoenzyme producers. Kerase and Pronase are two examples of industrial proteases produced by actinomycetes. However, there is no report on the production and partial purification of protease from actinomycetes of Iran. The main goal of this research is isolating and screening of protease – producing actinomycete from the soil samples. Also, the protease enzyme was extracted and partially purified from selected strains.

Methods: Four hundred and thirty - six actinomycetes were isolated from different soil samples collected from Garmsar and Varamin, Iran. The protease production ability of isolated strains was evaluated qualitatively by formation of clear zone on skim milk agar. Protease activity was measured quantitatively in the fermentation broths of 10 selected strains. The protease enzyme was partially purified by salting out using 80%-saturated ammonium sulfate and dialysis. Also, preliminary identification of the selected strains was done by 16SrRNA ribotyping.

Results: From 436 actinoycetes isolates, 50 isolates showed protease activity in Skim milk agar and 10 isolates were chosen after quantitative protease assay. Activity of the protease in UTMC01520 and UTMC01492, the most potent isolates and control enzyme (Alcalase®), were 572.8 and 369 and 1156.25 (U /ml), respectively. 16SrRNA analysis showed *Streptomyces sp.* UTMC01520 has 99.8% similarity to *Streptomyces sundarbansensis* and *Nocardiopsis sp*. UTMC01492 has100% similarity to *Nocardiopsis arvandica* .

Conclusion: Although nothing was done for optimization of enzyme production conditions, considerable amounts of proteases were produced which reveals the high potential of actinomycetes isolated from soil of Iran. Therefore production and purification of these enzymes to be used in biotechnological industries such as preparation of detergents, foods and protein hydrolysates, find economical applications.

Keywords: Proteases; Actinomycetes; Soil